

REMARKS

Claims 16 to 24 and 29 to 34 were rejected under 35 U.S.C. 103(a) as being unpatentable over Taub (U.S. Patent No. 1,727,621) in view of Topham et al. (U.S. Patent No. 5,044,604). Claims 25, 26 and 28 were rejected under 35 U.S.C. 103(a) as being unpatentable over Taub in view of Topham et al. and Cummings (U.S. Patent No. 2,439,240). Claim 27 was rejected under 35 U.S.C. 103(a) as being unpatentable over Taub in view of Topham et al., Cummings and Blume (U.S. Patent 5,345,965).

Claims 17 and 20 are hereby canceled without prejudice. Claims 16, 31 and 33 are hereby amended and new claim 35 is hereby added. Support is found for example at paragraphs [0025], [0029], [0034] and [0035].

Reconsideration of the application based on the following remarks is respectfully requested.

Office Action of October 7, 2009 is Non-Final

The Office Action Summary page indicates that the Office Action is non-final; however, page 6 of the Office Action states that the Office Action is final. Applicants' representative, Clint Mehall, spoke with Examiner Baskin via telephone on December 1, 2009 and Examiner Baskin confirmed that the Office Action is non-final. Applicants thank Examiner Baskin for his courtesy.

35 U.S.C. 103(a) Rejections: Taub and Topham et al.

Claims 16 to 24 and 29 to 34 were rejected under 35 U.S.C. 103(a) as being unpatentable over Taub in view of Topham et al.

Taub discloses a poppet valve that includes a stem 48 having a reduced portion 50 which is threaded to receive a valve head 52. (Taub, page 2, lines 15 to 20; Fig. 3). An end of valve head 52 is peened over at 54 for fixing the head 52 securely to the stem. (Id.). "The head 52 is formed on its stem-connected side with an annular ridge 56 having a frusto-conical outer surface fitting within the larger encl of a tapered shroud 58, the opposite end of the shroud fitting the

reduced portion 50 of the valve stem and abutting against the shoulder 51.” (Id., page 2, lines 26 to 32; Fig. 3).

Topham et al. discloses a plastic valve plug 7 connected to a valve stem 6. (Topham et al., col. 4, lines 23 to 24). An inner portion 20 of valve plug 7 includes a number of radial reinforcing ribs 25 connecting a sleeve 24 and a shell 23. (Id., col. 7, lines 14 to 20).

Claim 16, as amended, recites “[a] lightweight valve comprising:

a valve stem;

a hollow valve cone having a region of greater diameter; and

a valve disk, the valve cone and the valve disk together forming a hollow space, the valve disk having a gripping receiver for gripping an end portion of the valve stem, the valve disk having a recess defined therein that has an edge region including an edge step for supporting the valve cone;

wherein the gripping receiver is formed by reinforcing ribs on the valve disk, each of the reinforcing ribs including an end face facing a center of the valve disk center and forming a wall portion gripping an outer circumference of the valve stem, the region of greater diameter of the valve cone engaging in the recess of the valve disk, the valve cone being welded together with the valve stem and being welded together with the valve disk in the recess.” Claims 17 to 24, 29, 30, 34 and 35 are dependent on claim 16.

Claim 33, as amended, recites “[a] lightweight valve comprising:

a valve stem;

a hollow valve cone having a region of greater diameter; and

a valve disk, the valve cone and the valve disk together forming a hollow space, the valve disk having a gripping receiver for gripping the valve stem formed by a plurality of reinforcing ribs on the valve disk extending radially inward from a circumference of the disk to grip an outer circumference of the valve stem and a recess defined therein that has an edge region including an edge step for supporting the valve cone, each of the reinforcing ribs including an end face facing a center of the valve disk center and forming a wall portion gripping an outer circumference of the valve stem, the region of greater diameter of the valve cone engaging in the recess of the

valve disk, the valve cone being welded together with the valve stem and being welded together with the valve disk in the recess.”

It is respectfully submitted that neither Taub nor Topham et al., alone or in combination, discloses the requirement of claims 16 and 33 of “each of the reinforcing ribs including an end face facing a center of the valve disk center and forming a wall portion gripping an outer circumference of the valve stem.” Taub does not include reinforcing ribs. Topham et al. discloses a number of radial reinforcing ribs 25 connecting a sleeve 24 and a shell 23. In Topham et al., radial reinforcing ribs 25 do not each include end faces forming a wall portion gripping an outer circumference of valve stem 6. Instead, sleeve 24 grips valve stem 6. Thus, reinforcing ribs 25 in Topham et al. do not each include “an end face facing a center of the valve disk center and forming a wall portion gripping an outer circumference of the valve stem” as required by claims 16 and 33 and claims 16 and 33 are not obvious over Taub in view of Topham et al. for this reason.

It is also respectfully submitted that neither Taub nor Topham et al., alone or in combination, discloses the requirement of claims 16 and 33 of “the valve cone being welded together with the valve stem and being welded together with the valve disk in the recess.” Taub does not disclose any of the shrouds 30, 44, 58, 68, 78 being welded together with the respective valve stems 18, 38, 48, 60, 74 or together with the any of the valve heads 20, 36, 52, 62, 82, particularly in a recess. Also, Topham et al. does not disclose a valve cone or welding and thus cannot cure this deficiency of Taub. Furthermore, one of skill in the art could not have welded the plastic valve plug 7 of Topham et al. with the metal shrouds 30, 44, 58, 68, 78 of Taub. Thus, claims 16 and 33 are not obvious over Taub in view of Topham et al. for this additional reason.

Based on the foregoing, withdrawal of the rejection under 35 U.S.C. 102(b) of claims 16 to 24, 29, 30, 33 and 34 is respectfully requested.

Claim 31 recites “[a] method for manufacturing a lightweight valve comprising:
producing a first one-piece component forming a valve disk having a recess defined

therein that has an edge region including an edge step and a gripping receiver formed by a plurality of reinforcing ribs by casting, forming and/or powder metallurgy method, each of the reinforcing ribs including an end face facing a center of the valve disk center and forming a wall portion;

producing a second one-piece component forming a valve stem having an outer circumference, the gripping receiver being for the valve stem;

producing a third component forming a hollow valve cone having an end of greater diameter;

connecting the first and second components by a material, non-positive and/or positive connection between the wall portion and the outer circumference of the valve stem, and

pushing the third component onto the second component and connecting the third component to the first and second components by engaging the end of greater diameter of the hollow valve cone in the recess of the valve disk and welding the valve disk in the recess and welding the valve stem to the hollow valve cone.” Claim 32 is dependent on claim 31.

It is respectfully submitted that neither Taub nor Topham et al., alone or in combination, discloses the step of claim 31 of “connecting the first and second components by a material, non-positive and/or positive connection between the wall portion and the outer circumference of the valve stem.” Taub does not include reinforcing ribs having end faces that form a wall portion and thus does not disclose the step of claim 31 of “connecting the first and second components.”

As similarly discussed above, the radial reinforcing ribs 25 of Topham et al. do not each include end faces forming a wall portion. Thus, Topham et al. also step of claim 31 of “connecting the first and second components” and claim 31 is not obvious over Taub in view of Topham et al. for this reason.

It is also respectfully submitted that neither Taub nor Topham et al., alone or in combination, discloses the step of claim 31 of “pushing the third component onto the second component and connecting the third component to the first and second components by engaging the end of greater diameter of the hollow valve cone in the recess of the valve disk and welding the valve disk in the recess and welding the valve stem to the hollow valve cone.” Taub does not disclose any of the shrouds 30, 44, 58, 68, 78 being welded together with the respective valve

stems 18, 38, 48, 60, 74 or together with the any of the valve heads 20, 36, 52, 62, 82, particularly in a recess. Also, Topham et al. does not disclose a valve cone or welding and thus cannot cure this deficiency of Taub. Furthermore, one of skill in the art could not have welded the plastic valve plug 7 of Topham et al. with the metal shrouds 30, 44, 58, 68, 78 of Taub. Thus, claim 31 is not obvious over Taub in view of Topham et al. for this additional reason.

Based on the foregoing, withdrawal of the rejection under 35 U.S.C. 102(b) of claims 31 and 32 is respectfully requested.

35 U.S.C. 103(a) Rejections: Taub, Topham et al. and Cummings

Claims 25, 26 and 28 were rejected under 35 U.S.C. 103(a) as being unpatentable over Taub in view of Topham et al. and Cummings (U.S. Patent No. 2,439,240).

Taub and Topham et al. are described above. Cummings discloses a hollow poppet valve that includes a hollow body portion 10 having a hollow stem 10a and a valve neck 10b. (Cummings, col. 3, lines 9 to 14). Valve neck 10b includes a rim end 10e that receives a head-dome 11. (Id., col. 3, lines 17 to 21). “The neck 10b of the valve body 10 has integral ribs or fins 13 extending radially inward therefrom and spaced apart 120° as shown in Figure 2. The three ribs or fins 13 thus provided terminate in spaced relation from each other at their inner ends as shown in Figure 2 to provide an opening 14 continuing the bore of the hollow stem 10a up to the head dome 11 and thereby simplifying the insertion of tools for finishing the bore of the stem 10a. These fins 13 extend down into the throat of the valve as illustrated at 13a in Figure 1 and extend up to top edges 13b having the same contour as the bottom face of the head dome 11 and bottoming this bottom face of the head dome.” (Id., col. 3, lines 28 to 42).

Claims 25, 26 and 28 are dependent on claim 16. Cummings does not disclose the “gripping receiver” or the welded arrangement required by claim 16 and thus does not cure the deficiency of Taub and Topham et al. with respect to claim 16. In view of the arguments presented above explaining why claim 16 is not unpatentable as obvious in view of Taub and Topham et al., withdrawal of the rejection under 35 U.S.C. 103(a) of claims 25, 26 and 28 is respectfully requested.

35 U.S.C. 103(a) Rejections: Taub, Topham et al., Cummings and Blume

Claim 27 was rejected under 35 U.S.C. 103(a) as being unpatentable over Taub in view of Topham et al., Cummings and Blume (U.S. Patent 5,345,965).

Taub, Topham et al. and Cummings are described above. Blume discloses a mud pump valve assembly including a valve body 22 and a valve seat 24.

Claim 27 is dependent on claim 16. Blume does not disclose “gripping receiver” or the welded arrangement required by claim 16 and thus does not cure the deficiency of Taub, Topham et al. and Cummings with respect to claim 16. In view of the arguments presented above explaining why claim 16 is not unpatentable as obvious in view of Taub and Topham et al., withdrawal of the rejection under 35 U.S.C. 103(a) of claim 27 is respectfully requested.

CONCLUSION

The present application is respectfully submitted as being in condition for allowance and applicants respectfully request such action.

Respectfully submitted,
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